

# Mixed Factoring Worksheet

## GCF

## GROUPING

1.  $3a + 6$

1.  $3(a+2)$

1.  $5x + 15 + xy + 3y$

1. \_\_\_\_\_

2.  $4x - 20$

2.  $4(x-5)$

2.  $xy + y + 2x + 2$

2. \_\_\_\_\_

3.  $2y^2 + 8xy$

3.  $2y(y^2+4x)$

3.  $2y - 8 + xy - 4x$

3. \_\_\_\_\_

4.  $5x + 10y - 15$

4.  $5(x+2y-3)$

4.  $6x - 42 + xy - 7y$

4. \_\_\_\_\_

5.  $42m - 7$

5.  $7(6m-1)$

5.  $3xy - 6x + 8y - 16$

5. \_\_\_\_\_

6.  $18xy^2 + 6x^3 - 12x^2$

6.  $6x(3y^2+x^2-2x)$

6.  $xy - 2yz + 5x - 10z$

6. \_\_\_\_\_

7.  $7a + 21p + 14$

7.  $7(a+3p+2)$

7.  $y^3 + 3y^2 + y + 3$

7. \_\_\_\_\_

8.  $40x^3y^6 - 16x^9y^5$

8.  $8x^8y^5(5y-2x)$

8.  $x^3 + 4x + x^2 + 4$

8. \_\_\_\_\_

9.  $x(y+3) + 5(y+3)$

9.  $(y+3)(x+5)$

9.  $5xy + 15x + 6y + 18$

9. \_\_\_\_\_

10.  $12x^3 + 16x^2 - 8x$

10.  $4x(3x^2+4x-2)$

10.  $2x^3 + x^2 + 8x + 4$

10. \_\_\_\_\_

11.  $2y^2 - 10y + 20$

11.  $2(y^2-5y+10)$

11.  $4x^2 - 8xy - 3x + 6y$

11. \_\_\_\_\_

12.  $24x - 16$

12.  $8(3x-2)$

12.  $2x^3 - x^2 - 10x + 5$

12. \_\_\_\_\_

13.  $20xyz + 12x^2z - 40yz$

13.  $4z(5xy+3x^2-10y)$

13.  $y^2 - 3y + yz - 3z$

13. \_\_\_\_\_

14.  $a^5 + 3a^4 - 6a^3 + 9a^2$

14.  $a^2(a^3+3a^2-6a+9)$

14.  $5x^2 - 20x^2y + 5z - 20yz$

14. \_\_\_\_\_

15.  $y^7 - y^2$

15.  $y^2(y^5-1)$

15.  $2x - xy + 18 - 9y$

15. \_\_\_\_\_

16.  $6t^2 + 24$

16.  $6(t^2+4)$

16.  $12x + 10 + 6xy + 5y$

16. \_\_\_\_\_

17.  $-5x^3 + 10x^2$

17.  $-5x^2(x-2)$

17.  $7y - 7 + 5xy - 5x$

17. \_\_\_\_\_

18.  $-9a^2b + 18a^2b^2 - 3ab$

18.  $-3ab(3a-6ab+1)$

18.  $6x^2y - 21x^2 - 4y + 14$

18. \_\_\_\_\_

19.  $25x^4z + 15x^3z + 5x^2z$

19.  $5x^2z(5x^2+3x+1)$

19.  $30 + 5y^2 - 6x - xy^2$

19. \_\_\_\_\_

20.  $3y^2 + 5x$

20.  $3y^2+5x$

20.  $4ax - 4ab - 2bx + 2b^2$

20. \_\_\_\_\_

NO GCF!

## GROUPING

$$1) 5(x+3) + y(x+3) \\ = (x+3)(5+y)$$

$$2) y(x+1) + 2(x+1) \\ (x+1)(y+2)$$

$$3) 2(y-4) + x(y-4) \\ (y-4)(2+x)$$

$$4) 6(x-7) + y(x-7) \\ (x-7)(6+y)$$

$$5) 3x(y-2) + 8(y-2) \\ (y-2)(3x+8)$$

$$6) y(x-2z) + 5(x-2z) \\ (x-2z)(y+5)$$

$$7) y^2(y+3) + 1(y+3) \\ (y+3)(y^2+1)$$

$$8) x(x^2+4) + 1(x^2+4) \\ (x^2+4)(x+1)$$

$$9) ~~5x(y+3) + 6(y+3)~~ \\ (y+3)(5x+6)$$

$$10) x^2(2x+1) + 4(2x+1) \\ (2x+1)(x^2+4)$$

$$11) 4x(x-2y) - 3(x-2y) \\ (x-2y)(4x-3)$$

$$12) \frac{x^2(2x-1) - 5(2x-1)}{(2x-1)(x^2-5)}$$

$$13) \frac{y(y-3) + 2(y-3)}{(y-3)(y+2)}$$

$$14) \frac{5x^2(1-4y) + 5z(1-4y)}{(1-4y)(5x^2+5z)}$$

$$5(1-4y)(x^2+z)$$

$$15) \frac{x(2-y) + 9(2-y)}{(x+9)(2-y)}$$

$$16) \frac{2(6x+5) + y(6x+5)}{(6x+5)(2+y)}$$

$$17) \frac{7(y-1) + 5x(y-1)}{(y-1)(7+5x)}$$

$$18) \frac{3x^2(2y-7) - 2(2y-7)}{(2y-7)(3x^2-2)}$$

$$19) \frac{5(b+y^2) - x(b+y^2)}{(5-x)(b+y^2)}$$

$$20) \frac{4a(x-b) - 2b(x-b)}{(x-b)(4a-2b)}$$

$$2(x-b)(2a-b)$$



## BINOMIALS

1.)  $(x-2)(x+2)$

2.)  $(y+6)(y-6)$

3.)  $(10-p)(10+p)$

4.)  $(2x+1)(2x-1)$

5.)  $(3t-1)(3t+1)$

6.)  $a^2 + 25$  can't factor SUM

7.)  $(7x-4)(7x+4)$

8.)  $(2y-5)(2y+5)$

9.)  $3(4x^2 - 9)$   
 $3(2x-3)(2x+3)$

10.)  $9(z^2 - 4)$   
 $9(z-2)(z+2)$

11.)  $(a+3)(a^2 + 3a + 9)$

12.)  $(2y+1)(4y^2 - 2y + 1)$

13.)  $(y+5)(y^2 - 5y + 25)$

14.)  $(b+2)(b^2 - 2b + 4)$

15.)  $(x+4)(x^2 - 4x + 16)$

16.)  $(y-1)(y^2 + y + 1)$

17.)  $(3a-2)(9a^2 + 6a + 4)$

18.)  $(c-5)(c^2 + 5c + 25)$

19.)  $(2x-3)(4x^2 + 6x + 9)$

20.)  $(4y-1)(16y^2 + 4y + 1)$

# T R I N O M I A L S

$$1.) (x+6)(x+1)$$

$$2.) (x+2)(x+4)$$

$$3.) (x+10)(x+3)$$

$$4.) (x+5)^2$$

$$5.) (x-3)(x-5)$$

$$6.) (x-3)^2$$

$$7.) (x-9)(x-1)$$

$$8.) (x-6)(x+3)$$

$$9.) (x-6)(x+5)$$

$$10.) (x-2)(x+1)$$

$$11.) (x+7)(x-6)$$

$$12.) (y+6)(y-2)$$

$$13.) \begin{aligned} 2a^2 + a - 10a - 5 \\ a(2a+1) - 5(2a+1) \\ (a-5)(2a+1) \end{aligned}$$

$$14.) \begin{aligned} 3c^2 + 6c + 2c + 4 \\ 3c(c+2) + 2(c+2) \\ (3c+2)(c+2) \end{aligned}$$

$$15.) \begin{aligned} 2x^2 + 2x + 5x + 5 \\ 2x(x+1) + 5(x+1) \\ (x+1)(2x+5) \end{aligned}$$

$$16.) \begin{aligned} 6y^2 - 15y + 4y - 10 \\ 3y(2y-5) + 2(2y-5) \\ (2y-5)(3y+2) \end{aligned}$$

$$17.) \begin{aligned} 4a^2 - 14a + 6a - 21 \\ 2a(2a-7) + 3(2a-7) \\ (2a-7)(2a+3) \end{aligned}$$

$$18.) \begin{aligned} 3x^2 + 3x - 2x - 2 \\ 3x(x+1) - 2(x+1) \\ (x+1)(3x-2) \end{aligned}$$

19.) Not-factorable....  
can use QF to find roots

$$20.) \begin{aligned} 8y^2 - 20y - 2y + 5 \\ 4y(2y-5) - 1(2y-5) \\ (4y-1)(2y-5) \end{aligned}$$

$$\text{roots: } \frac{5 \pm \sqrt{25-12}}{2(8)}$$

$$= \frac{5 \pm \sqrt{13}}{16}$$

$$\sim 0.232 \text{ OR } 1.434$$